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ABSTRACT

MOST OF THE EVALUATION ACTIVITY ASSOCIATED WITH THE INDIVIDUALLY PRESCRIBED INSTRUCTION (IPI) PROJECT IS FORMATIVE EVALUATION, THAT IS, EVALUATION THAT PROVIDES FEEDBACK FOR INDICATING AREAS OR OPERATIONS WHERE IMPROVEMENTS ARE NEEDED. THIS PAPER DESCRIBES THE PROGRAM FOR FORMATIVE EVALUATION AND PRESENTS SOME DATA OBTAINED IN SOME REPRESENTATIVE FORMATIVE EVALUATION STUDIES. MOST OF THE DATA CONCERNS THE VARIETY OF LEVELS AND SPEEDS AT WHICH CHILDREN IN THE SAME GRADE WORK. (JY)

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THE IPI EVALUATION PROGRAM

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THE IPI EVALUATION PROGRAM

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The Individually Prescribed Instruction Project is a long-term development project, and necessarily most of the evaluation activity associated with it is formative evaluation, that is, evaluation that provides feedback for indicating areas or operations where improvements are needed. For the most part this paper will describe the program for formative evaluation and present some data obtained in some representative formative evaluation studies. However, it is essential for a development program to make regular assessments of the extent to which it is achieving its basic goals, to see if it is proceeding in the proper direction, to see if it is coming closer and closer to some ideal operation. This may be considered interim summative evaluation or perhaps another aspect of formative evaluation.

The overall goal of the IPI Project is "to develop an educational program which is maximally adaptive to the requirements of the individual learner." As developers, and as evaluators, one question which the project staff continues to ask is "How well are we approximating this goal?" During the past year a variety of types of data (both hard data and soft data) dealing with this basic goal have been gathered. It is felt that these data substantiate the point that IPI has been developed into a significant and workable model that provides for individualization of instruction within the context of regular school operation.

Table 1 is an example of the kind of data that is gathered regularly for all IPI schools under the field testing program that is being carried out by RBS with the collaboration of ACC. These data are for the McAnnulty School and show where pupils at each grade level were actually working in the IPI math curriculum as of about the middle of the school year. This is a relatively gross analysis but does show that pupils at a given grade level were spread out considerably in terms of the actual level of content with which they were working at a given time. It is difficult to equate the levels A, B, C, etc., with the content found at various grade levels in typical schools because the IPI content is quite drastically reorganized. That is, for example, some of the level D objectives might actually be covered at the seventh grade level in a more traditional school (and so on). However, as far as amount of content is concerned, each of these levels may be thought of as roughly comparable to the amount covered in one grade level in a conventional school. If that is the case, it can be seen that in McAnnulty School some second graders are working at B level (about second grade work) while others are three levels ahead, at the E level (about fifth grade work). Of course, the bulk of pupils are at the two levels in between these extremes. These data seem to document the fact that in schools using IPI, the program is adapting to the individual student in the sense that pupils are indeed working at various levels even though they are in the same year in school and may be in the same classroom.

TABLE 1

NUMBER OF STUDENTS AT EACH IPI MATHEMATICS CURRICULUM LEVEL IN GRADES 1 THROUGH 6 AT McANNULTY SCHOOL

Grade Level	Number of Students at Each Level							Median Level
	A	B	C	D	E	F	G	
I		86	34					B
II		4	73	64	2			C
III			12	63	4			D
IV			6	96	71			D
V			3	19	75	48	4	E
VI				6	42	69	26	F

In the IPI math curriculum any given level, such as level D, is divided into 12 or 13 units representing different areas or different topics. This means that, for example, the 64 second graders studying at level D will in turn be spread out over these units within the level. It would be difficult to show this detail of variability in the specific units in which students are studying through a table displayed in this way, but these levels have been divided into two parts in the summary shown in Table 2, which is based on Oakleaf School pupils. Here B_1 includes the first half of the units at B level and B_2 the second half of the units.

TABLE 2

NUMBER OF PUPILS IN THE OAKLEAF SCHOOL AT SUCCESSIVE LEVELS IN THE IPI MATHEMATICS CURRICULUM AT THE END OF THE 1967-1968 SCHOOL YEAR

Grade in School	Number of Students at Each Level													Median Level*
	B_1	B_2	C_1	C_2	D_1	D_2	E_1	E_2	F_1	F_2	G_1	G_2	H_1	
I	10	4	17	2	4									C_1
II			4	9	10	1	2							D_1
III			1		11	8	11	1						D_2
IV					10	5	13	3	4	2				E_1
V						5	17	8	9	3	1			E_1
VI							4	5	9	4	3	3	1	F_1

*to nearest integral

It should also be emphasized that where each pupil is and what progress he has made during the year is a reflection of what he has shown by his performance on achievement tests. A student does not leave a unit until he has shown mastery on the unit posttest. So these data show not only where pupils are studying but also their tested level of achievement.

The fact that some IPI pupils at every given grade level actually work with content that is typically covered at higher grade levels can also be documented by some data gathered by RBS using the Iowa Test of Basic Skills. To do this pupils at every grade level took the two ITBS arithmetic tests for all grades with no time limit. That is, we wanted to find out, for example, what a third grader could do with third grade

content, fourth grade content, fifth grade content, and so on. We also wanted the same information for each grade level. The data we have to present here were gathered from three schools located in lower socio-economic level neighborhoods. One school used IPI math: the others were control schools. The mean I.Q. was essentially the same for all three schools.

One example of data obtained from this study are presented in Table 3. This table shows the percent of students at each grade level who showed some mastery of items on each level test of the ITBS. It will be noted that in each case the percent of IPI students able to do work at levels beyond their actual grade placement is considerably larger than that for the control students.

TABLE 3

PERCENT OF THIRD GRADE PUPILS PASSING SOME ITEMS AT INDICATED GRADE LEVELS ON THE ARITHMETIC PROBLEMS TEST OF THE ITBS FOR AN IPI SCHOOL AND TWO CONTROL SCHOOLS IN LOW SOCIO-ECONOMIC STATUS NEIGHBORHOODS

Test Level	School		
	IPI (N=55)	Control 1 (N=100)	Control 2 (N=66)
3	100	100	100
4	98	99	94
5	75	58	14
6	56	37	8
7	47	28	2
8	46	26	2
9	46	26	2

Related data documenting the extent of individualization within a grade level is found in data on the number of units completed during the school year. This shows that pupils are not only at different points in the curriculum but are also proceeding at different rates. Such data are shown in Tables 4 and 5. Perhaps the most interesting figures are those showing the minimum and maximum number of units completed at each grade level. Note that here we have such extreme ratios as 11 to 1 and 17 to 2. Of course, these data also provide evidence that IPI pupils are indeed making substantial progress in showing mastery of units of instruction during the year. It is also interesting to note that at some grade levels the fastest student is mastering twice as many units as is the average student.

Table 5 presents the data for IPI reading and shows very much the same variability. This starts at grade three since prior to that time most students are working in the programmed reading materials and are not studying lessons that are divided into units.

TABLE 4

MEAN, STANDARD DEVIATION, AND RANGE FOR NUMBER OF IPI MATHEMATICS UNITS MASTERED BY OAKLEAF PUPILS AT EACH GRADE LEVEL DURING 1967-1968

Grade	N	Mean	Standard Deviation	Minimum Number	Maximum Number	Range
1	37	4.16	2.84	1	11	10
2	24	8.67	2.06	4	12	8
3	32	9.03	2.89	3	14	11
4	36	9.47	2.43	4	15	11
5	42	8.33	3.24	2	17	15
6	29	9.93	3.16	5	18	13

TABLE 5

MEAN, STANDARD DEVIAITON, AND RANGE FOR NUMBER OF IPI READING UNITS MASTERED BY OAKLEAF PUPILS AT EACH LEVEL DURING 1967-1968

Grade	N	Mean	Standard Deviation	Minimum Number	Maximum Number	Range
3	32	2.34	2.68	1	8	7
4	36	5.69	2.61	1	9	8
5	42	6.52	2.44	2	12	10
6	29	7.76	2.75	2	13	11

Another basic goal of the IPI Project has been to set up a model for program (or curriculum) development involving a continuous gathering of data on performance of the system for purposes of finding its weak spots and improving them. The application of this model results in an interative process of curriculum development in which each step should result in a closer approximation to some ideal goal. This had led to a major emphasis on formative evaluation. This emphasis has been characteristic of the project since its inception, but during the past year the staff has attempted to formulate their ideas into an overall structure for evaluation. This has resulted in a draft of a monograph on the IPI evaluation procedure. Much of the plan is based on the structure provided in the outline of basic elements presented in the fold-out. The purpose of the chart is to lay out all of the basic components or elements of the program, to list the essential qualities of each in terms of how they should be manifested both in the plan and

operation of the program, and to show how these relate to the basic goals of the project. This listing of the qualities that should be found in the plan and operation for all elements in the system provides basic criteria for the task of formative evaluation. That is, they specify the major aspects to look for in studying the quality of the plan and operation. For example, in the plan column under Instructional Objectives it can be seen that quality (b) states that these "are sequenced in a prerequisite order." This quality is assumed to contribute to the achievement of Goal I, "Every pupil makes regular progress towards mastery of instructional content." The listing of this quality in the plan column serves to stress the point that, as objectives are being developed every effort must be made, on a logical basis, to organize them in a prerequisite order. The companion statement in the operation column, "are in prerequisite order as evidenced by pupil mastery and progression," is intended to emphasize the fact that the presence of this desired quality cannot merely be assumed but must be evaluated on the basis of empirical evidence. The basic purpose in having both a plan and operation column is to stress a major principle of this approach to curriculum development, namely that it is not enough to develop plans and materials and assume that these can be put into operation in the way envisioned. How they are actually used in operation must be monitored and must be modified on the basis of performance data. This is the central part of the task of formative evaluation.